AMENDMENTS TO THE CLAIMS

The following listing of claims replaces all prior listings and versions of claims in this application.

1. (Currently Amended) A method for converting a low resolution first image produced by a light sensor for receiving incident light radiated from a scene to a high resolution second image, whereby the light sensor is constructed as an array or matrix having a number of cells with each cell defining a predetermined area, which method comprises:

cyclically scanning the first image a number of times;

simultaneously moving the light sensor with the scanning stepwise an identical number of times relative to the light radiating scene in at least one direction thereby defining a number of subareas, such that the total distance covered during movement of the light sensor corresponds to the extent of the cell or to the extent of the cell plus a distance defined by or to a neighbor cell in the at least one movement direction, and

establishing a representation of the high-resolution second image by calculating the representation of the received incident light from the scene at each subarea;

wherein the light sensor is moved a distance in each step corresponding to the extent of the area covered by the cell in the direction of movement or to the extent of the area covered by the cell in the direction of movement plus a distance defined by or to the neighbor cell in the direction of movement, divided by the number of scanning times.

2. (Cancelled)

3. (Currently Amended) A ~~The~~ method ~~of claim 1~~ for converting a low resolution first image produced by a light sensor for receiving incident light radiated from a scene to a high resolution second image, whereby the light sensor is constructed as an array or matrix having a number of cells with each cell defining a predetermined area, which method comprises:

cyclically scanning the first image a number of times;

simultaneously moving the light sensor with the scanning stepwise an identical number of times relative to the light radiating scene in at least one direction thereby defining

a number of subareas, such that the total distance covered during movement of the light sensor corresponds to the extent of the cell or to the extent of the cell plus a distance defined by or to a neighbor cell in the at least one movement direction, and

establishing a representation of the high-resolution second image by calculating the representation of the received incident light from the scene at each subarea,

wherein the light sensor is moved a distance for each step corresponding to the extent of the area covered by the cell plus a distance defined by or to the neighbor cell minus the extent of the area of the smallest subarea to be calculated in the direction of movement, divided with the number of scanning times.

4. (Original) The method of claim 1, wherein the light sensor is moved asynchronously with the scannings.

5. (Currently Amended) A ~~The~~ method ~~of claim 1~~ for converting a low resolution first image produced by a light sensor for receiving incident light radiated from a scene to a high resolution second image, whereby the light sensor is constructed as an array or matrix having a number of cells with each cell defining a predetermined area, which method comprises:

cyclically scanning the first image a number of times;

simultaneously moving the light sensor with the scanning stepwise an identical number of times relative to the light radiating scene in at least one direction thereby defining a number of subareas, such that the total distance covered during movement of the light sensor corresponds to the extent of the cell or to the extent of the cell plus a distance defined by or to a neighbor cell in the at least one movement direction, and

establishing a representation of the high-resolution second image by calculating the representation of the received incident light from the scene at each subarea,

wherein incident light received from the scene is represented as a number of pixels at each subarea, and the method further comprises substituting at least some of the pixels with information of the position of the light sensor mounted on a sensor frame, thereby providing an identifiable coding of the position of the light sensor mounted on the sensor frame as a low resolution first image.

6. (Original) The method of claim 1, wherein the high resolution second image is computed by calculating the value for each subarea by means of the formula:

$I_a(z) = V_o*A/a(z) - \Sigma I_a(n)$ for $n=1$ to $n=N$, $n \neq z$

where

N = the number of subareas into which each cell is split,

n = the index for subareas in the sensor cell,

a = the area of a subarea of the sensor cell,

V_o = the output signals from the sensor cells,

I_a = the computed light radiation received by the subarea a,

z = the subarea to be used for calculation, and

A = the area of the sensor cell.

7. (Currently Amended) The method of claim 1, which further comprises:

stepwise moving the light sensor by means of at least one driver relative to the light radiating scene,

recording the immediate position of the light sensor by at least one position sensor generating output representing the said sensor position,

sending the output to a computer having a software program for calculating control values on basis of the received output, and

sending signals representing the calculated control values to the at least one position driver for bringing this to drive the light sensor in such a way that the steps of movement as function of the scannings defines a predetermined curve.

8. (Original) The method of claim 6, which further comprises calibrating the method by:

moving the light sensor to a number of calibration positions by applying known energy values to the at least one driver,

obtaining a signal representing the incident light radiated from the scene at each calibration position, and

calculating a reference value representing the distance of the movement of the light sensor by comparing the different numbers of known energy values with the different signals representing the incident light radiated from the scene.

9. (Original) The method of claim 1, wherein the light sensor is moved in a system of x-y coordinates and moved at least in one of the x-y directions of this system or in the direction of a cell of the light sensor.

10. (Original) The method of claim 1, which further comprises minimizing the influence of errors in previous calculated or estimated values by means of a digital filter.

11. (Original) The method of claim 10, wherein the digital filter uses several values from several cycles to compute a filter output value by the following formula

$$I_a(nX_A,mY_A)=(F_{1,1})*V_0(p_{(1)}X,q_{(1)}Y)-(F_{2,2})*V_0(p_{(2)}X,q_{(2)}Y)-(F_{3,3})* \ldots.-(F_{A,A})*V_0(p_{(A)}X,q_{(A)}Y)-(G_{-1,-0})*I_a(n_{-1}X_A,m_{-0}Y_A)-(G_{-0,-1}) *I_a(n_0X_A,m_{-1}Y_A)-(G_{-1,-1})*I_a(n_{-1}X_A,m_{-1}Y_A) \ldots..-(G_{-n,-m})*I_a(n_{-n}X_A,m_{-m}Y_A),$$

where:

$I_a(nX_A,mY_A)$ is the light radiation value of the n,m'th element in the new X_A,Y_A matrix to be calculated,

$I_a(n_{-1}X_A, m_{-0}Y_A)$ is the previous calculated element of the n-1,m'th element of the new X_A,Y_A matrix,

$(G_{-1,-0})$ is the belonging predetermined filter value,

$I_a(n_{-0}X_A,m_{-1}Y_A)$ is the previous calculated element of the n,m-1'th element of the new X_A,Y_A matrix,

$(G_{-0,-1})$ is the belonging predetermined filter value,

$I_a(n_{-n}X_A,m_{-m}Y_A)$ is the previous calculated element of the n-n,m-m'th element of the new X_A,Y_A matrix,

$(G_{-n,-m})$ is the belonging predetermined filter value,

$V_0(p_{(1)}X,q_{(1)}Y)$ is the measured and stored output value of the p, q'th element in the physical sensor matrix overlapping the n, m'th element in the new calculated X_A,Y_A matrix from the first position,

$(F_{1,1})$ is the belonging predetermined filter value,

p,q are calculated from n/A and m/A,

$V_0(p_{(A)}X,q_{(A)}Y)$ is the measured and stored output value of the p,q'th element in the physical sensor matrix overlapping the n, m'th element in the new calculated X_A,Y_A matrix from the A'th position,

$(F_{A,A})$ is the belonging predetermined filter value, and

p,q are calculated from n/A and m/A.

12. (Currently Amended) An apparatus for converting a low resolution first image to a high resolution second image, comprising:

a light sensor for receiving incident light radiated from a scene to a high resolution second image, whereby the light sensor is constructed as an array or matrix having a number of cells, with each cell defining a predetermined area;

means for bringing the apparatus cyclically to scan the first image a number of times by means of the light sensor;

means for moving the light sensor simultaneously with the scanning stepwise by an identical number of times relative to the light radiating scene in at least one direction of movement, whereby the total distance covered during the movement of the light sensor corresponds to the extent of the area covered by the cell in the direction of movement or to the extent of the area covered by the cell in the direction of movement plus a distance defined by or to a neighbor cell in the ~~at least one movement~~ direction of movement, divided by the number of scanning times in order to define a number of subareas, and

means for establishing a representation of a high resolution second image by calculating the representation of the received incident light from the scene at each subarea.

13. (Currently Amended) An apparatus for converting a low resolution first image to a high resolution second image, comprising:

a light sensor for receiving incident light radiated from a scene to a high resolution second image, whereby the light sensor is constructed as an array or matrix having a number of cells, with each cell defining a predetermined area;

a frame for movably mounting the light sensor;

an activator for bringing the apparatus cyclically to scan a low resolution first image a number of times by means of the sensor;

at least one driver for simultaneously moving the light sensor with the scanning stepwise an identical number of times relative to the light radiating scene in at least one direction, whereby the total distance covered during the movement of the light sensor corresponds to the extent of the cell or to the extent of the cell plus a distance defined by or to a neighbor cell in the at least one movement direction to define a number of subareas; and

at least one position sensor for recording the immediate position of the light sensor relative to the frame and sending output representing the position to a computer having a software program for calculating control values on basis of the received output and sending signals representing the calculated control values to the at least one position driver for bringing this to drive the light sensor in such a way that the steps of movement as function of the scannings defines a predetermined curve in a coordinate system,

wherein a representation of the high resolution second image is established by calculating the representation of the received incident light from the scene at each subarea by means of the formula:

$$I_a(z) = V_0 * A/a(z) - \Sigma I_a(n) \text{ for } n=1 \text{ to } n=N,\ n \neq z$$

where

N = the number of subareas into which each cell is split,

n = the index for subareas in the light sensor cell,

a = the area of a subarea of the light sensor cell,

V_0 = the output signals from the light sensor cells,

I_a = the computed light radiation received by the subarea a,

z = the subarea to be used for calculation, and

A = the area of the light sensor cell.

14. (Canceled)

15. (Original) The apparatus of claim 13, which further comprises a digital filter arranged for minimizing the influence of at least one error in the value.

16. (Original) The apparatus of claim 15, wherein the digital filter uses several values from several cycles to compute a filter output value by the following formula

$$I_a(nX_A,mY_A)=(F_{1,1})*V_0(p_{(1)}X,q_{(1)}Y)-(F_{2,2})*V_0(p_{(2)}X,q_{(2)}Y)-(F_{3,3})* \\ \ldots\text{-}(F_{A,A})*V_0(p_{(A)}X,q_{(A)}Y)-(G_{-1,-0})*I_a(n_{-1}X_A,m_{-0}Y_A)-(G_{-0,-1}) \\ *I_a(n_0X_A,m_{-1}Y_A)-(G_{-1,-1})*I_a(n_{-1}X_A,m_{-1}Y_A) \\ \ldots\text{-}(G_{-n,-m})*I_a(n_{-n}X_A,m_{-m}Y_A),$$

where,

$I_a(nX_A,mY_A)$ is the light radiation value of the n,m'th element in the new X_A,Y_A matrix to be calculated,

$I_a(n_{-1}X_A,m_{-0}Y_A)$ is the previous calculated element of the n-1,m'th element of the new X_A,Y_A matrix,

$(G_{-1,-0})$ is the belonging predetermined filter value,

$I_a(n_{-0}X_A,m_{-1}Y_A)$ is the previous calculated element of the n,m-1'th element of the new X_A,Y_A matrix,

$(G_{-0,-1})$ is the belonging predetermined filter value,

$I_a(n_{-n}X_A,m_{-m}Y_A)$ is the previous calculated element of the n-n, m-m'th element of the new X_A,Y_A matrix, $(G_{-n,-m})$ is the belonging predetermined filter value,

$V_0(p_{(1)}X,q_{(1)}Y)$ is the measured and stored output value of the p,q'th element in the physical sensor matrix overlapping the n,m'th element in the new calculated X_A,Y_A matrix from the first position,

$(F_{1,1})$ is the belonging predetermined filter value,

p,q are calculated from n/A and m/A,

$V_0(p_{(A)}X,q_{(A)}Y)$ is the measured and stored output value of the p,q'th element in the physical sensor matrix overlapping the n, m'th element in the new calculated X_A, Y_A matrix from the A'th position, and

$(F_{A,A})$ is the belonging predetermined filter value, and p,q are calculated from n/A and m/A.

17. (Original) The apparatus of claim 13, wherein the computer is provided with a software program for establishing a representation of the high resolution image by calculating the representation of the received incident light from the scene at each subarea.

18. (Original) The apparatus of claim 13, wherein the at least one driver is an electro-mechanical device or a piezoelectric-element.

19. (Original) The apparatus of claim 13, wherein the at least one driver comprises a coil rigidly mounted on a base frame and an anchoring means mounted on the sensor frame, with the sensor frame being moveably mounted on the base frame, and the anchoring means being actuated by an attractive force induced by the coil, thereby pulling the anchor toward the coil.